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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO.        |
|---|-------------|----------------------|---------------------|-------------------------|
| 10/724,713  | 12/02/2003  | Yoshihiro Ikoma      | 65933-055           | 2215                    |
| 7590  | 11/15/2006  |                      | EXAMINER            |                         |
| McDERMOTT, WILL & EMERY<br>600 13th Street, N.W.<br>Washington, DC 20005-3096 |             |                      |                     | CHUO, TONY SHENG HSIANG |
|   |             |                      | ART UNIT            | PAPER NUMBER            |
|   |             |                      | 1745                |                         |

DATE MAILED: 11/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                              |                         |  |
|------------------------------|------------------------------|-------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b>       | <b>Applicant(s)</b>     |  |
|                              | 10/724,713                   | IKOMA, YOSHIHIRO        |  |
|                              | <b>Examiner</b><br>Tony Chuo | <b>Art Unit</b><br>1745 |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 17 October 2006.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-16 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 02 December 2003 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ .                                    |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ .  | 6) <input type="checkbox"/> Other: _____ .                        |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/17/06 has been entered.

### ***Response to Amendment***

2. Claims 1-16 are currently pending. The amended claim 1 does overcome the previously stated 102 and 103 rejections. However, upon further consideration, claims 1-16 are currently rejected under the following new 102 and 103 rejections.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Furuya et al (US 4816431). The Furuya reference discloses a gas permeable electrode

for use as an air electrode in a fuel cell comprising a gas diffusion layer and a reaction layer formed over the gas diffusion layer wherein the reaction layer comprises a hydrophilic carbon black, platinum supported on the hydrophilic carbon black, an ion exchange resin, and a hydrophobic carbon black having a water-repellent surface. In addition, it also discloses a content of the hydrophobic carbon black in the reaction layer that is 40% with respect to a weight of the entire catalyst layer (See column 1, lines 7-10 and column 4, lines 51-64). Examiner's note: It is well known in the art that a fuel cell comprises an air electrode, a fuel electrode, and a solid polymer electrolyte membrane between the electrodes.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2-4 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furuya et al (US 4816431) in view of Terazono et al (US 2002/0009626). The Furuya reference is applied to claim 1 for reasons stated above. However, Furuya et al does not expressly teach an average value of lattice spacing of the [002] plane,  $L_c(002)$ , of the second carbon particle that is between 0.337nm and 0.348nm and a crystallite size in a direction of c-axis,  $L_c(002)$ , of the second carbon particle that is between 3nm and 18nm. The Terazono reference discloses a graphitized carbon support for a

catalyst layer that has an average lattice spacing of  $d_{002}$  of 0.341 and a crystallite size  $L_c$  of 3.5 nm (See paragraph [0008],[0048]). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use graphitized carbon particles having the above cited properties as the hydrophobic carbon black particles in the gas diffusion electrode of Furuya in order to have adequate water repellency and the degree of water repellency in the gas diffusion electrode can be controlled by the degree of graphitization of the carbon black particles (See paragraphs [0013],[0016],[0075]).

7. Claims 5 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furuya et al (US 4816431) in view of Koschany et al (US 6451470). The Furuya reference is applied to claim 1 for reasons stated above. However, Furuya et al does not expressly disclose a gas diffusion layer that also includes the first hydrophilic carbon particle and the second hydrophobic carbon particle. The Koschany reference discloses a gas diffusion layer comprising a first carbon fiber material that is filled with a second carbon material that has a hydrophobic surface (See column 4, lines 16-32). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Furuya gas permeable electrode to include a gas diffusion layer that also includes the first hydrophilic carbon particle and the second hydrophobic carbon particle in order to maintain a high effective diffusion constant for reaction gases and a low effective diffusion constant for water so that water content is balanced in the electrode.

8. Claims 6-8 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furuya et al (US 4816431) in view of Terazono et al (US 2002/0009626) as applied to claims 2-4 above, and further in view of Koschany et al (US 6451470). However, Furuya et al as modified by Terazono et al does not expressly disclose a gas diffusion layer that also includes the first hydrophilic carbon particle and the second hydrophobic carbon particle. The Koschany reference discloses a gas diffusion layer comprising a first carbon fiber material that is filled with a second carbon material that has a hydrophobic surface (See column 4, lines 16-32). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Furuya/Terazono gas permeable electrode to include a gas diffusion layer that also includes the first hydrophilic carbon particle and the second hydrophobic carbon particle in order to maintain a high effective diffusion constant for reaction gases and a low effective diffusion constant for water so that water content is balanced in the electrode.

***Response to Arguments***

9. Applicant's arguments, see Remarks, filed on 10/17/06, with respect to the rejection(s) of claim(s) 1-16 under 35 USC 102 and 103 have been fully considered and are persuasive. Therefore, the rejections have been withdrawn. However, upon further consideration, new ground(s) of rejection are made in view of Furuya et al.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571) 272-0717. The examiner can normally be reached on M-F, 8:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's trainer, Susy Tsang-Foster can be reached on (571) 272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC



SUSY TSANG-FOSTER  
PRIMARY EXAMINER